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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,729	02/01/2006	Kazutoshi Kojima	OGOSH46USA	7682

270 7590 09/03/2008

HOWSON AND HOWSON
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EXAMINER	
SALERNO, SARAH KATE	
ART UNIT	PAPER NUMBER
2814	
MAIL DATE	DELIVERY MODE
09/03/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,729	KOJIMA ET AL.	
	Examiner	Art Unit	
	SARAH K. SALERNO	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6,17,18,21,24,28 and 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6,17,18,21,24,28 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment/arguments filed on 06/02/08 as being acknowledged and entered. By this amendment claims 2-5, 7-16, 19-20, 22-23,25-27 & 29-30 are canceled, no new claims have been added, claims 1, 6, 17-18, 21, 24, 28 & 31 are pending and no claims are withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 17-18 & 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Powell (US Patent 6,165,874).

Claim 1: Powell teaches a silicon carbide epitaxial wafer which is formed on a substrate that is less than 1° off from the {0001} surface of silicon carbide having an a-type crystal structure, said silicon carbide epitaxial wafer being formed on a {0001} C face of the substrate and said substrate being silicon carbide substrate having a 4H crystal structure (Cols. 7-8, 12, 14 & 16-17).

Claim 17: Powell teaches the silicon carbide wafer has a flat surface (Fig. 5-7).

Claims 18 & 21: Powell teaches a semiconductor device formed on said silicon carbide epitaxial wafer (Col. 3-4)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 6, 24, 28 & 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powell et al(US Patent 6,165,874) in view of Steckl et al. ("Epitaxial Growth of B-SiC on Si by RTCVD with C3H8 and SiH4"; IEEE Transactions on Electron Devices Vol. 39, No. 1, Jan 1992 pages 64-73)

Claim 6: Powell teaches a manufacturing method of a silicon carbide epitaxial wafer, comprising the steps of:

cleansing a surface of a substrate with a mixed gas of hydrogen gas at 1400°C to 1600°C;

epitaxially growing silicon carbide on a{0001} C face of the substrate that is less than 1° off from the {0001 } surface of silicon carbide having an a-type crystal structure, the substrate being silicon carbide substrate having a 4H crystal structure; and

during said epitaxially growing step, using a source gas of silane and propane having a compositional ratio of C and Si of 1 or less and a growth pressure of 25mbar or less (Cols. 7-8, 12, 14 & 16-17).

Powell does not teach cleansing a surface of a substrate with a mixed gas of hydrogen gas and propane gas and a growth pressure of 25mbar or less. Steckl teaches cleansing a surface of a substrate with a mixed gas of hydrogen gas and propane gas and a growth pressure of 25mbar or less (page 66) to improve the subsequent growth of epitaxial SiC (page 64). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method taught by Powell to include the cleansing with hydrogen and propane and a growth pressure of 250mbar or less to improve the subsequent growth of epitaxial SiC as taught by Steckl (page 64).

Claim 24: Powell teaches the substrate has a surface step with a height of 1nm or less (Col. 20 lines 59-65).

Claim 28: Powell teaches a silicon carbide epitaxial wafer prepared by a process comprising the steps of:

cleansing a surface of a substrate with a mixed gas of hydrogen gas at 1400°C to 1600°C;

epitaxially growing silicon carbide on a {0001} C face of the substrate that is less than 1° off from the {0001 } surface of silicon carbide having an a-type crystal structure, the substrate being silicon carbide substrate having a 4H crystal structure; and

during said epitaxially growing step, using a source gas of silane and propane having a compositional ratio of C and Si of 1 or less and a growth pressure of 25mbar or less (Cols. 7-8, 12, 14 & 16-17).

Powell does not teach cleansing a surface of a substrate with a mixed gas of hydrogen gas and propane gas and a growth pressure of 25mbar or less. Steckl teaches cleansing a surface of a substrate with a mixed gas of hydrogen gas and propane gas and a growth pressure of 25mbar or less (page 66) to improve the subsequent growth of epitaxial SiC (page 64). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method taught by Powell to include the cleansing with hydrogen and propane and a growth pressure of 250mbar or less to improve the subsequent growth of epitaxial SiC as taught by Steckl (page 64).

Claim 31: Powell teaches a semiconductor device formed on said silicon carbide epitaxial wafer (Col. 3-4)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH K. SALERNO whose telephone number is (571)270-1266. The examiner can normally be reached on M-F 8:00-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. K. S./
Examiner, Art Unit 2814

/Theresa T. Doan/
Primary Examiner, Art Unit 2814